

NSW Annual Immunisation Coverage Report, 2011

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Abstract: This annual report, the third in the series, documents trends in immunisation coverage in NSW for children, adolescents and the elderly, to the end of 2011. **Methods:** Data from the Australian Childhood Immunisation Register, the NSW School Immunisation Program and the NSW Population Health Survey were used to calculate various measures of population coverage. **Results:** During 2011, greater than 90% coverage was maintained for children at 12 and 24 months of age. For children at 5 years of age the improvement seen in 2010 was sustained, with coverage at or near 90%. For adolescents, there was improved coverage for all doses of human papillomavirus vaccine, both doses of hepatitis B vaccine, varicella vaccine and the dose of diphtheria, tetanus and acellular pertussis given to school attendees in Years 7 and 10. Pneumococcal vaccination coverage in the elderly has been steadily rising, although it has remained lower than the influenza coverage estimates. **Conclusion:** This report provides trends in immunisation coverage in NSW across the age spectrum. The inclusion of coverage estimates for the pneumococcal conjugate, varicella and meningococcal C vaccines in the official coverage assessments for 'fully immunised' in 2013 is a welcome initiative.

This is the third *New South Wales (NSW) Annual Immunisation Coverage Report*. This series of annual reports provides information on trends and issues in immunisation coverage in NSW to facilitate the monitoring of NSW immunisation programs. This report uses the longstanding international

practice of reporting coverage at key milestone ages to measure coverage against national benchmarks and to track trends over time. It is adapted from annual national immunisation reports published since 2008.¹

The Australian Childhood Immunisation Register was established on 1 January 1996 by incorporating demographic data from Medicare on all Medicare-registered children aged less than 7 years.² The operations of the Australian Childhood Immunisation Register have been discussed in detail elsewhere.³

High levels of reporting to the Australian Childhood Immunisation Register are maintained by a system of incentive payments for immunisation providers and carers. These have been discussed in detail elsewhere.³ However, changes to immunisation policy, the incentive payment system and changes to the 'fully immunised' coverage algorithms may have an impact on reported vaccination coverage; some recent changes are highlighted in Box 1 and also referred to in this report.

Table 1 presents the vaccines delivered through the NSW Immunisation Program for children in 2011. The only new vaccine to be introduced into the NSW Immunisation Program in 2011 was the 13-valent pneumococcal conjugate vaccine, Prevenar 13[®], which replaced Prevenar[®], the 7-valent vaccine, on 1 July.

Methods

Measuring immunisation coverage using the Australian Childhood Immunisation Register

The cohort method has been used for calculating coverage at the population level (national and state/territory)⁴ since the inception of the Australian Childhood Immunisation Register. Cohort immunisation status is assessed at 12 months of age (for vaccines due at 6 months), 24 months of age (for vaccines due at 12 months), and 5 years of age (for vaccines due at 4 years). A 3-month lag period is allowed for the late notification of immunisations to the Australian Childhood Immunisation Register.⁴ If a child's records indicate receipt of the last dose of a vaccine that requires more than one dose to complete the series, it is assumed that earlier vaccinations in the sequence have been given. This assumption has been shown to be valid.^{5,6}

The proportion of children designated as 'fully immunised' was calculated using the number of Medicare-registered children who were completely immunised with

Box 1. Recent changes in immunisation policy, immunisation incentives and coverage calculation algorithms

October 2011 – Children aged between 12 and 35 months who have completed a primary pneumococcal vaccination course with Prevenar® (7-valent pneumococcal conjugate vaccine, 7vPCV) were eligible to receive a free supplementary dose of Prevenar 13® (13-valent pneumococcal conjugate vaccine, 13vPCV) from 1 October 2011 to 30 September 2012.

July 2011 – Prevenar 13® (13-valent pneumococcal conjugate vaccine, 13vPCV) replaced Prevenar® (7-valent pneumococcal conjugate vaccine, 7vPCV) on the National Immunisation Program for children at 2, 4 and 6 months of age in all states and territories except the Northern Territory (which replaced 10vPCV with 13vPCV from 1 October 2011).

December 2009 – Changes in the coverage calculation algorithms that tightened the rules regarding receipt of *Haemophilus influenzae* type b and hepatitis B vaccines for children aged 12 and 24 months to lead to more accurate measures of *Haemophilus influenzae* type b and hepatitis B vaccine coverage in Australia.

October 2009 – The recommendation by the Australian Technical Advisory Group on Immunisation that the fourth dose of diphtheria, tetanus and acellular pertussis (DTPa)-containing vaccine can be given from 3½ years of age instead of the previously recommended 4 years of age.

March 2009 – The recommendation by NSW Health and the Australian Technical Advisory Group on Immunisation to parents and immunisation providers to consider bringing the first dose of DTPa forward to 6 weeks of age to provide earlier protection.

January 2009 – Changes to the overdue rules so that children were classified as overdue for pre-school boosters at 4 years and 1 month instead of the previous 5 years of age. This applied to parental and provider incentive payments.

The Maternity Immunisation Allowance changed from a full payment at 18–24 months of age to being paid in two instalments: the first when the child is fully immunised and aged between 18 and 24 months; and the second when the child is fully immunised and aged between 4 and 5 years. This applied only to children who had not yet already received the full payment at 2 years of age.

October 2008 – The General Practice Immunisation Incentive Service Incentive Payment (\$18.50 for completing a schedule point) ceased. Information payments of \$6 were retained.

December 2007 – Coverage algorithm for immunisations due at 4 years of age changed to assess children at 5 years, not 6 years.

Table 1. Schedule of vaccines delivered through the NSW Immunisation Program, to children, adolescents and adults in 2011

Age	Vaccine							
Childhood vaccines								
Birth	Hep B							
2 months	Hep B	DTPa	Hib	Polio		PCV		Rotavirus
4 months	Hep B	DTPa	Hib	Polio		PCV		Rotavirus
6 months	Hep B	DTPa	Hib	Polio		PCV		Flu ^d
12 months			Hib		MMR		Men C	
18 months					VZV			
4 years		DTPa		Polio	MMR			
Adolescent vaccines								
12 years	Hep B ^a	dTpa			VZV ^a	HPV		
15 years		dTpa						Flu ^{b,d} 23vPCV ^c
Adult vaccines								
≥50 years								Flu ^{b,d} 23vPCV ^b
65 years								Flu ^d 23vPCV

Hep B: hepatitis B vaccine; DTPa: diphtheria, tetanus, and acellular pertussis-containing vaccine; dTpa: adolescent and adult formulation DTPa; Hib: *Haemophilus influenzae* type b vaccine; MMR: measles-mumps-rubella vaccine; VZV: varicella zoster virus vaccine; PCV: pneumococcal conjugate vaccine (7vPCV till 30 June 2011, 13vPCV from 1 July 2011 onwards); Men C: meningococcal C vaccine; HPV: human papilloma virus vaccine (females only); Flu: influenza vaccine; 23vPCV: 23-valent pneumococcal polysaccharide vaccine.

^aCatch-up only.

^bFor Aboriginal people only.

^cAboriginal adults with medical risk factors.

^dAnnual vaccination, all aged ≥6 months with medical risk factors, non-Aboriginal adults ≥65 years.

Source: National Immunisation Program Schedule.

the vaccines of interest by the designated age as the numerator and the total number of Medicare-registered children in the age cohort as the denominator. Vaccines included were those used nationally for the purposes of incentive payments. 'Fully immunised' at 12 months of age was defined as a child having a record on the Australian Childhood Immunisation Register of three doses of a diphtheria, tetanus and pertussis (DTP)-containing vaccine, three doses of polio vaccine, two or three doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or three doses of any other Hib vaccine, and two or three doses of Comvax[®] hepatitis B vaccine or three doses of all other hepatitis B vaccines. 'Fully immunised' at 24 months of age was defined as three or four doses of a DTP-containing vaccine, three doses of polio vaccine, three or four doses of PRP-OMP containing Hib vaccine or four doses of any other Hib vaccine, three or four doses of Comvax[®] hepatitis B vaccine or four doses of all other hepatitis B vaccines, and one dose of a measles- mumps- and rubella (MMR)-containing vaccine. 'Fully immunised' at 5 years of age was defined as four or five doses of a DTP-containing vaccine, four doses of polio vaccine, and two doses of an MMR-containing vaccine.

Previous reports included analysis by local health district (LHD), data on other National Immunisation Program vaccines not included in 'fully immunised' calculations (pneumococcal conjugate vaccine, rotavirus vaccine, varicella vaccine and meningococcal C vaccine), vaccination timeliness and data comparing Aboriginal and non-Aboriginal children. However, it was not possible to include these analyses in this report due to a review by the Department of Health and Ageing of processes for releasing data from the Australian Childhood Immunisation Register.

Coverage in adolescents and the elderly

Information describing coverage for vaccines given to adolescents was collected from the NSW School Immunisation Program. Vaccination status is recorded by school immunisation teams and counts are collated by LHDs and NSW Health. The denominator is the number of school enrolments at the start of the year. The coverage rates may underestimate the true vaccination coverage as they represent only those vaccinations received through the school program and do not include doses received from general practitioners or other immunisation providers. Methods are presented in more detail elsewhere.⁷ For varicella and hepatitis B vaccines, students who were not vaccinated due to previous vaccination or varicella infection are included in the denominator. The proportion of these students is unknown.

Influenza and pneumococcal vaccination coverage estimates in the elderly were obtained from the NSW

Table 2. Percentage of children immunised at 12 months, 24 months and 5 years of age, by vaccine, in NSW compared with Australia, 2011

Vaccine	Milestone age (months)	NSW %	Australia %
Diphtheria, tetanus, pertussis	12 ^a	92.1	92.1
	24 ^b	94.5	94.6
	60 ^c	90.1	90.0
Poliomyelitis	12 ^a	92.1	92.1
	24 ^b	94.4	94.5
	60 ^c	90.1	90.0
<i>Haemophilus influenzae</i> type b	12 ^a	91.7	91.8
	24 ^b	94.7	94.6
	60 ^c	NI	NI
Hepatitis B	12 ^a	91.7	91.6
	24 ^b	94.0	94.0
	60 ^c	NI	NI
Measles-mumps-rubella	12 ^a	NI	NI
	24 ^b	93.7	93.9
	60 ^c	90.0	89.9
Fully immunised	12 ^a	91.3	91.4
	24 ^b	92.0	92.2
	60 ^c	89.6	89.5

^aBirth cohort born 1 January 2010–31 December 2010: Three doses of a diphtheria, tetanus and pertussis (DTP)-containing vaccine, three doses of polio vaccine, two or three doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or three doses of any other Hib vaccine, and two or three doses of Comvax[®] hepatitis B vaccine or three doses of all other hepatitis B vaccines.

^bBirth cohort born 1 January 2009–31 December 2009: Three or four doses of a diphtheria, tetanus and acellular pertussis-containing vaccine, three doses of polio vaccine, three or four doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or four doses of any other Hib vaccine, three or four doses of Comvax[®] hepatitis B vaccine or four doses of all other hepatitis B vaccines, and one dose of a measles- mumps- and rubella-containing vaccine.

^cBirth cohort born 1 January 2006–31 December 2006: Four or five doses of a diphtheria, tetanus and acellular pertussis-containing vaccine, four doses of polio vaccine, and two doses of a measles- mumps- and rubella-containing vaccine.

NI: this vaccine at this age milestone is not included in the calculation of coverage estimates.

Source: Australian Childhood Immunisation Register.

Population Health Survey. This is a rolling random digit-dialled telephone survey, with vaccination status determined from patient recall at the time of the interview. Influenza and pneumococcal vaccination coverage estimates are based on 4732 and 4395 respondents in NSW, respectively. Methods and results are presented in more detail elsewhere.⁸

Results

Overall coverage estimates

In NSW, coverage for all individual vaccines for the 12-month age group is greater than 91%. Similarly, for

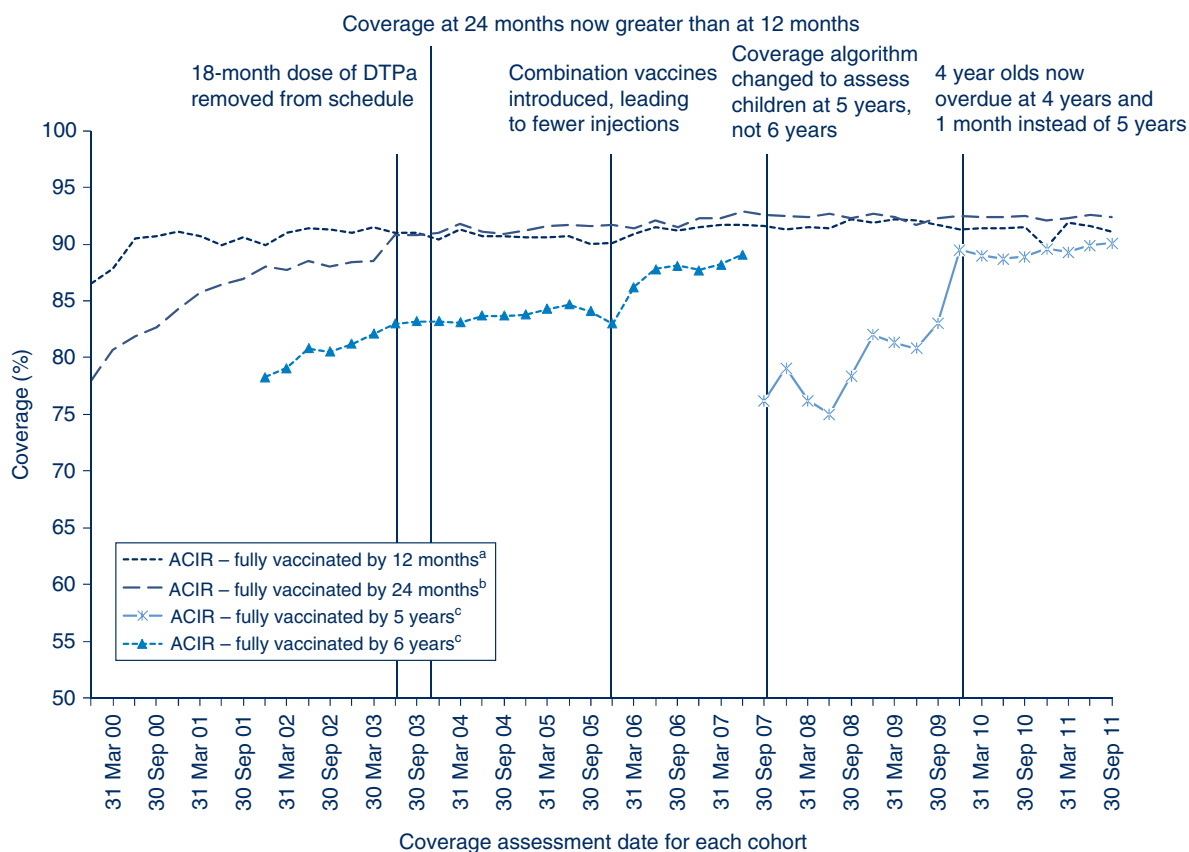


Figure 1. Trends in 'fully immunised'^{a,b,c} vaccination coverage, NSW, 2000–2011, for four age cohorts of children.

^aThree doses of a diphtheria, tetanus and acellular pertussis-containing (DTPa) vaccine, three doses of polio vaccine, two or three doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or three doses of any other Hib vaccine, and two or three doses of Comvax[®] hepatitis B vaccine or three doses of all other hepatitis B vaccines.

^bThree or four doses of a DTPa-containing vaccine, three doses of polio vaccine, three or four doses of PRP-OMP containing Hib vaccine or four doses of any other Hib vaccine, three or four doses of Comvax[®] hepatitis B vaccine or four doses of all other hepatitis B vaccines, and one dose of a measles, mumps and rubella (MMR)-containing vaccine.

^cFour or five doses of a DTPa-containing vaccine, four doses of polio vaccine, and two doses of an MMR-containing vaccine. ACIR: Australian Childhood Immunisation Register.

Source: Australian Childhood Immunisation Register.

the 24-month age group, coverage for all individual vaccines is also higher than 90%. Recorded coverage for the 5-year age group is higher than 90% for all vaccines (Table 2). Figure 1 shows time trends in 'fully immunised' childhood vaccination coverage at three milestone ages in NSW. The proportion 'fully immunised' at 1 and 2 years of age has been at high levels since 2003 whereas coverage at 5 years of age increased markedly during 2010 and remained at that level during 2011.

Coverage estimates for children aged less than 3 years

In NSW before 2009, coverage for the 12-month and 24-month age groups for Hib and hepatitis B vaccines was greater than for DTPa and polio, due to a less stringent algorithm for calculating coverage. Since the change in algorithm in the latter half of 2009, coverage estimates for Hib and hepatitis B have lowered and become similar to

those of DTPa and polio at just under 92% (Figure 2) for the 12-month age group and approximately 95% (Figure 3) for the 24-month age group. These newer estimates more accurately reflect the true proportion of children fully vaccinated for these vaccines. Also in 2011, coverage for the MMR vaccine for the 24-month age group was around 94% (Table 2).

Coverage estimates for children aged 5–6 years

The trends in childhood vaccination coverage in NSW for individual vaccines (DTPa, polio and MMR) at 5 years of age (6 years of age prior to December 2007) are shown in Figure 4. Coverage for all three vaccines was almost identical and remained steady across the whole period until mid-2006 when a sharp increase of almost 5% was recorded, likely due to the introduction of combination vaccines. Coverage at 5 years of age was substantially lower than at 6 years of age due to the shorter time for the

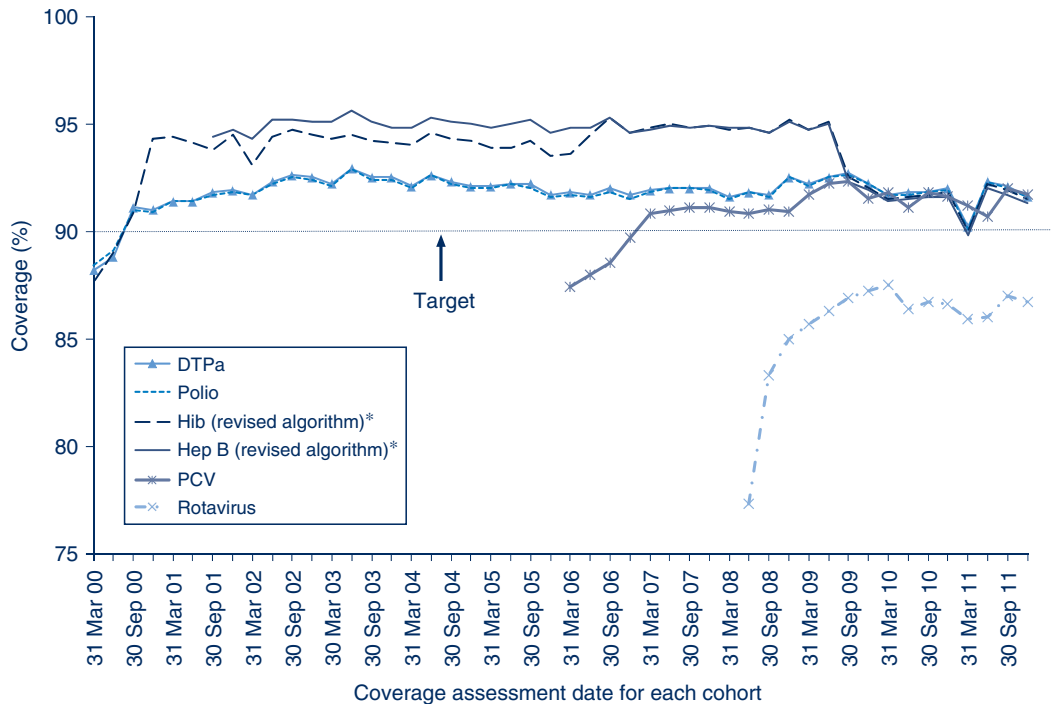


Figure 2. Trends in 'fully immunised' coverage estimates for individual vaccines at 12 months of age (third dose of DTPa, polio, hepatitis B and Hib), NSW, 2000–2011.

By 3-month birth cohorts born between 1 January 1999 and 31 December 2010. Coverage assessment date was 12 months after the last birth date of each cohort.

*Prior to December 2009, the algorithm stated that receipt of two or three doses of *Haemophilus influenzae* type b (Hib) and hepatitis B vaccines rendered a child 'fully immunised' for these vaccines. After December 2009, changes to the algorithm were made to tighten the rules regarding 'fully immunised' for Hib and hepatitis B vaccines.

DTPa: diphtheria, tetanus, pertussis (acellular) – paediatric formulation

Hep B: hepatitis B

PCV: pneumococcal conjugate vaccine

Source: Australian Childhood Immunisation Register.

recording of delayed vaccinations. However, in 2011, the 5-year coverage for DTPa, polio and MMR increased markedly to be slightly above 90% following a change to due and overdue rules. The overall 'fully immunised' rate for 5-year coverage was 89.6% in NSW, which was similar to the national 5-year coverage rate of 89.5% (Table 2). However, at 5 years of age, the proportion recorded as being 'fully immunised' was lower than that at earlier age milestones.

Coverage in adolescents

NSW Adolescent Vaccination Program coverage data for high school students for 2011 by LHD are shown in Table 3. For NSW, coverage varied by vaccine and dose with better coverage for the first and second doses of human papillomavirus vaccine (HPV) and the dose of dTpa in Year 7 attendees. In 2011, coverage in adolescents increased for all vaccine types and doses compared to the previous year.⁹ The greatest improvement was seen with varicella vaccine, with coverage increasing 13 percentage points from 32% to 45%. Vaccine coverage in adolescents varied by LHD (Table 3).

Vaccines for the elderly (pneumococcal and influenza)

The proportion of people aged 65 years and over who were vaccinated for influenza in the past 12 months has remained relatively stable at over 70% in NSW during the period 2002–2011. However, pneumococcal vaccination (23-valent pneumococcal polysaccharide vaccine, 23vPPV) in the previous 5 years remained lower than the influenza coverage estimates. The highest coverage estimate for pneumococcal vaccination in the elderly was observed in 2006 at 61%, the year after its inclusion on the National Immunisation Program (Figure 5). Coverage in 2011 was 60%. Vaccine coverage in the elderly varied by LHD (Table 4).

Discussion

These data reveal that 90% coverage benchmarks have been reached for children at both 12 and 24 months of age for NSW. During 2011, there was an increase in coverage at the 5-year milestone, to approximately 90%.

Coverage at 24 months of age exceeds that at 12 months in NSW. This is likely related to the greater period of time

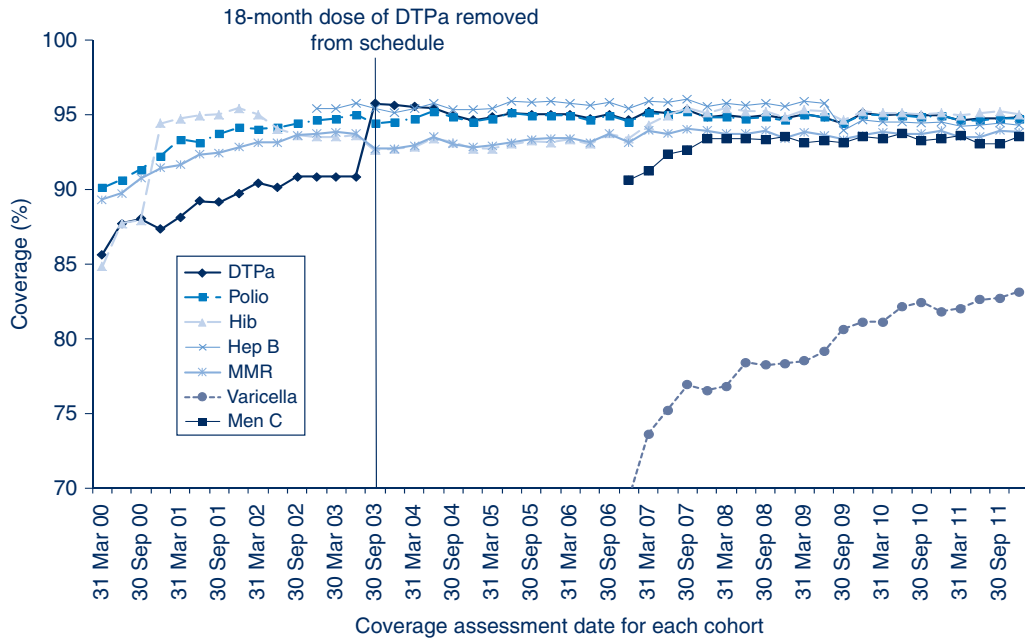


Figure 3. Trends in 'fully immunised' coverage estimates for individual vaccines at 24 months of age (DTPa, polio, hepatitis B, Hib, MMR, varicella, Men C),^a for NSW 3-month birth cohorts between 2000 and 2011.

By 3-month birth cohorts born between 1 January 1999 and 31 December 2009. Coverage assessment date was 24 months after the last birth date of each cohort.

^aThird dose of DTPa (fourth dose – pre-Sept 2003); third dose of polio; third dose of hepatitis B, third dose of Hib; one dose of MMR).
 DTPa: diphtheria, tetanus, pertussis (acellular) – paediatric formulation
 Men C: Meningococcal C
 Hep B: hepatitis B
 MMR: measles-mumps-rubella
 Hib: *Haemophilus influenzae* type b

Source: Australian Childhood Immunisation Register.

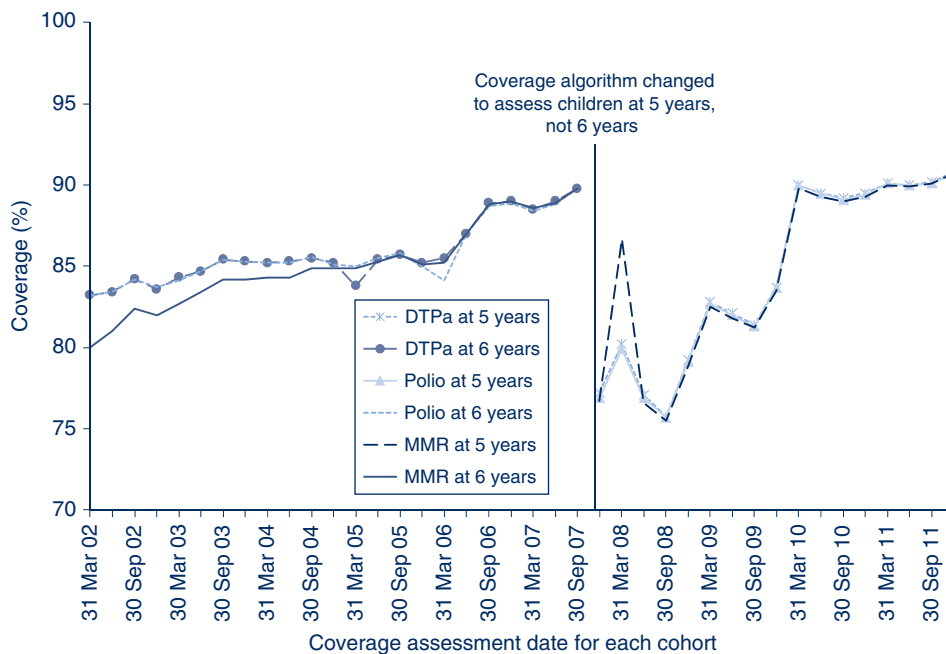


Figure 4. Trends in 'fully immunised' coverage estimates for individual vaccines (DTPa, polio and MMR)^a at 5 years of age (6 years up to December 2007) in NSW.

Coverage assessment date was 72 months after the last birth date of each cohort up to December 2007 and then 60 months after the last birth date of each cohort.

^aFourth dose of DTPa and polio and second dose of MMR.
 DTPa: diphtheria, tetanus, pertussis (acellular) – paediatric formulation.
 MMR: measles-mumps-rubella

Source: Australian Childhood Immunisation Register.

Table 3. Vaccination coverage estimates for individual vaccines, NSW adolescent school attendees in NSW, 2011

Vaccine	Local Health District ^a																Total doses administered N
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NN %	NS %	SES %	SN %	SWS %	SYD %	WN %	WS %	NSW %	
HPV dose 1 ^b	88	68	81	77	80	85	78	73	82	80	78	83	81	83	81	81	34 524
HPV dose 2 ^b	82	61	75	70	74	82	72	67	77	75	72	82	80	81	76	76	32 582
HPV dose 3 ^b	77	56	68	63	65	75	68	59	75	70	68	78	77	73	71	71	30 426
Hepatitis B dose 1 ^b	71	59	66	67	75	73	64	70	60	86	69	69	66	73	64	68	30 426
Hepatitis B dose 2 ^b	66	47	59	59	64	66	58	61	57	81	60	66	63	66	59	63	53 517
dTpa ^b	89	70	80	70	76	77	74	70	79	87	70	72	76	74	77	77	65 756
Varicella ^b	52	51	52	36	49	48	44	45	37	48	34	43	43	43	48	45	38 409
dTpa ^c	77	61	70	60	65	66	61	73	67	61	64	62	71	68	66	66	57 633

^aCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.
^bYear 7 school attendees.
^cYear 10 school attendees.
 HPV: human papillomavirus
 dTpa: diphtheria, tetanus, pertussis (acellular) – adolescent and adult formulation
 Source: NSW School Immunisation Program.

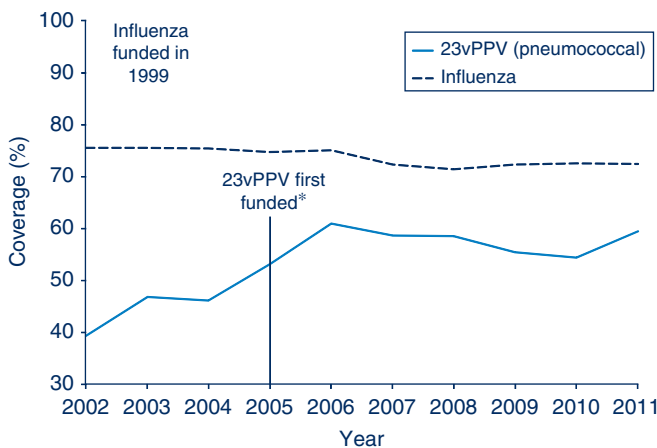


Figure 5. Trends in vaccination coverage estimates for individual vaccines (23vPPV and influenza) for adults aged 65 years and over^a in NSW, vaccinated against pneumococcal disease in the last 5 years and vaccinated against influenza in the last 12 months, 2002–2011.

^aVaccinated against pneumococcal disease in the last 5 years and vaccinated against influenza in the last 12 months.
 *In 2005, 23vPPV was included in the National Immunisation Program.
 23vPPV: 23-valent pneumococcal polysaccharide vaccine

Source: NSW Population Health Survey 2011 (HOIST). Centre for Epidemiology and Evidence, NSW Ministry of Health.

between due date and assessment time (12 and 6 months respectively), and potentially the maternity incentive payment assessed at 18–24 months. The continued improvement in coverage at 5 years of age is due to further improved timeliness of vaccination, and is probably

related to the change to the overdue rules in January 2009, where children became overdue for their pre-school boosters at 4 years and 1 month of age instead of the previous 5 years (Box 1). This change had an impact on eligibility for child care benefits for parents and outcome payments for providers. It is also possible that the splitting of the Maternity Immunisation Allowance in 2011 could have affected these data, as it applied to children turning 4 years from 2011 onwards.

It should be noted that at present several vaccines on the National Immunisation Program schedule are not included in the assessment of ‘fully immunised’ (i.e. PCV, meningococcal C, rotavirus and varicella). This annual report does not provide coverage data on these vaccines. Only data for the more longstanding and established vaccines are provided to Medicare Locals, public health units and immunisation providers. As these non-assessable vaccines have been routinely incorporated into the childhood immunisation schedule for some time, their inclusion in the official coverage assessments for ‘fully immunised’ (except for rotavirus vaccine) has been made policy by the Department of Health and Ageing and is effective from 1 July 2013. This will facilitate more complete monitoring of program delivery, potentially boost coverage by allowing existing incentive payments to apply to them, and provide a more realistic assessment of ‘fully immunised’.

School-based vaccination in NSW has achieved relatively high coverage for most vaccines, which is similar to or better than that achieved in other Australian jurisdictions and higher than in settings where adolescent vaccines are implemented through primary care.⁷ Coverage for

Table 4. Vaccination coverage estimates for individual vaccines (23vPPV and influenza) for adults aged 65 years and over in NSW, vaccinated against pneumococcal disease in the last 5 years and vaccinated against influenza in the last 12 months, 2011

Population surveyed and vaccine	Local Health District ^a																Total doses administered N
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NN %	NS %	SES %	SN %	SWS %	SYD %	WN %	WS %	NSW %	
Influenza (males)	76	67	74	67	75	73	70	69	76	71	75	71	66	66	70	72	4732
Influenza (females)	76	70	78	78	74	73	73	74	69	74	75	71	73	79	68	74	
Pneumococcal (males)	60	48	61	55	59	60	46	53	57	49	57	47	47	54	50	54	4395
Pneumococcal (females)	64	52	66	64	60	57	58	65	56	58	63	54	56	63	56	60	

^aCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.
Source: NSW Population Health Survey 2011.

varicella is lower than other vaccines in all other jurisdictions as well as NSW. This is likely due to a combination of students not vaccinated due to previous clinical history of chickenpox, students with previous receipt of varicella vaccine, and perceived less serious clinical outcomes. The change in advice given to parents about the need for a dose at 12 years of age that occurred in 2011 may also have had an impact. Coverage for all adolescent vaccines increased from 2010 to 2011.

Coverage for the elderly has been consistently high for influenza vaccine, but less so for pneumococcal vaccine, perhaps due to greater awareness of the yearly influenza vaccination programs. Uptake of pneumococcal vaccine in 2011 is likely to have been negatively affected by reported adverse events in that year and the associated temporary suspension of any doses of pneumococcal vaccine in NSW. These results may also be partly explained by an Australian study in the elderly that found, in comparison to written records held by immunisation providers, a telephone survey over-estimated influenza coverage in the elderly by 3%, and under-estimated pneumococcal coverage by 8%.¹⁰

Conclusion

Data provided in this report by the Australian Childhood Immunisation Register reflect the successful delivery of the National Immunisation Program in NSW, while identifying some areas for improvement. The Australian Childhood Immunisation Register, the NSW Population Health Survey and monitoring through the NSW School Vaccination Program continue to be very useful tools for administering the National Immunisation Program and monitoring its implementation in NSW.

References

- Hull B, Deeks S, Menzies R, McIntyre P. Immunisation coverage annual report, 2007. *Commun Dis Intell* 2009; 33: 170–87.
- Hull BP, McIntyre PB, Heath TC, Sayer GP. Measuring immunisation coverage in Australia. A review of the Australian Childhood Immunisation Register. *Aust Fam Physician* 1999; 28: 55–60.
- Hull BP, Deeks SL, McIntyre PB. The Australian Childhood Immunisation Register – a model for universal immunisation registers? *Vaccine* 2009; 27: 5054–60. doi:10.1016/j.vaccine.2009.06.056
- O’Brien ED, Sam GA, Mead C. Methodology for measuring Australia’s childhood immunisation coverage. *Commun Dis Intell* 1998; 22(3): 36–7.
- Hull BP, McIntyre PB. Immunisation coverage reporting through the Australian Childhood Immunisation Register – an evaluation of the third-dose assumption. *Aust N Z J Public Health* 2000; 24(1): 17–21. doi:10.1111/j.1467-842X.2000.tb00717.x
- Hull BP, Lawrence GL, MacIntyre CR, McIntyre PB. Estimating immunisation coverage: is the ‘third dose assumption’ still valid? *Commun Dis Intell* 2003; 27(3): 357–61.
- Ward KF, Menzies RI, Quinn HE, Campbell-Lloyd S. School-based vaccination in NSW. *N S W Public Health Bull* 2010; 21(9–10): 237–42. doi:10.1071/NB10046
- Centre for Epidemiology and Evidence. Health Statistics New South Wales. Sydney: NSW Ministry of Health. Available at: http://www.healthstats.nsw.gov.au/Indicator/com_flupneumoimmu_age/com_flupneumoimmu_age_trend (Cited 17 October 2012).
- Hull BP, Dey A, Campbell-Lloyd S, Menzies RI, McIntyre PB. NSW Annual Immunisation Coverage Report, 2011. *N S W Public Health Bull* 2010; 22(9–10): 179–95.
- Andrews RM. Assessment of vaccine coverage following the introduction of a publicly funded pneumococcal vaccine program for the elderly in Victoria, Australia. *Vaccine* 2005; 23: 2756–61. doi:10.1016/j.vaccine.2004.11.039